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A CASE OF PARTIAL TRICHIASIS RELIEVED
BY STELLWAG'S METHOD OF REVERS-
ING AND REPLANTING THE
CILINARY BORDER.

BY F. C. HOTZ, M. D., CHICAGO, ILL.

[Reported at the Chicago Society of Ophthalmology and Otology, April 12.]

The feasibility of skin-grafting, which has been successfully demonstrated by numerous instances, suggested to Prof. Stellwag a new way of operating for trichiasis. His method is as original as it is simple; but I believe it is as yet little known among oculists, as he published it in a medical periodical¹ not often read by specialists.

The first steps of the operation are the same as in the operation for scalping; the lid border is split into an anterior and posterior leaf, and a transverse incision parallel to the lid border and 4 to 5 millimeters from it is made from canthus to canthus. But at each canthus the direction of this incision is so changed that there it joins the ends of the first cut by which the lid border has been split. In this way a long and

¹Allgemeine Wiener Mediz. Zeitschrift, 1883.

narrow flap is obtained which contains all the eye-lashes. This flap is completely dissected off; but instead of being thrown away, as in scalping, it is, after all bleeding of the wound has ceased, put back in its place again, but with its edges reversed so that the originally upper edge is now the lower edge and *vice versa*. By this reversion of the flap the direction of the eyelashes is not only thoroughly changed, so as to turn them away from the eyeball, but they are also removed a little distance from the edge of the lid by the interposition of a narrow strip of smooth skin which serves as a sort of substitute for the obliterated intermarginal border and effectually prevents the eyelashes from ever coming again in contact with the cornea.

At a first glance this operation seems to have at last solved the vexed problem of devising a simple and rational method for the relief of trichiasis. But when we consider the possibility that the replanted flap may mortify—and we know very slight disturbances can cause it—and when we learn from Prof. Stellwag that in some cases the eyelashes dropped out and did not grow again; and that in the other cases he was not sure whether they remained, then the operation shows a less promising and inviting aspect. For, if the flap mortifies or the eyelashes disappear, the final result would be nothing more nor less than what the old operation of scalping has accomplished.

These considerations have prevented me from trying this operation in cases of total trichiasis. But, when a short time ago a case of partial trichiasis of the lower eyelid came under my care at the eye and ear infirmary, I concluded to try Stellwag's operation, because if it should fail or the eyelashes come out, the disfiguration would scarcely be perceptible in this case.

The patient, æt. 31, was admitted on February 10, and the house-book shows that one year ago the lid of his right eye was operated on for trichiasis by Dr. Montgomery, applying his transverse ligature described by him at the June meeting of last year. The final result of this operation was exactly

what I should expect from a transverse ligature, to-wit, the lateral portions of the lid border were everted; but the central portion was not affected by the contracture of the ligated tissues; there the eyelashes were still brushing over the cornea, causing a continued irritation of the eye and pannus of the lower half of the cornea. On February 17 I performed the operation under strictly antiseptic precautions; the instruments were kept in a five per cent. solution of carbolic acid; the eyelids were thoroughly washed with solution of sublimate (1 to 5,000) and during the operation the wound was continuously irrigated with warm sublimate (1 to 10,000). I followed strictly and verbatim the directions as Stellwag gave them in his paper. I split the lid border with an iridectomy knife as far as the cilia were inverted; from each end of this incision a vertical cut, 4 to 5 millimeters long, was made from the lid border downwards, and the lower ends of these incisions were united by a transverse incision. Thus a rectangular flap, 6 by 4 or 5 millimeters, was mapped out whose upper edge contained all the inverted eyelashes. This flap was completely detached and packed between cloth which was constantly sprinkled with a warm solution of sublimate. The wound was then carefully scrutinized for bulbs of cilia which might have been left in splitting the lid; but none could be found. The blood oozed out quite freely, and it was the most tedious part of the operation to wait until the bleeding ceased. But at last it ceased, and after the wound was carefully cleansed of all coagulated blood the flap was placed back upon it with the eyelashes turned downwards and the originally lower edge of the flap joined to the lid border. When the flap was nicely adjusted, the lids were closed and once more irrigated with sublimate. A piece of aseptic tinfoil coated with vaseline was placed upon the lids and a binocular bandage applied. This dressing was not disturbed for three days, when it was changed (February 20) I found the flap perfectly united with the lid; but I continued the binocular bandage two days longer; and then the right eye alone was kept bandaged for two days more. February 24, however, the flap

was found so firmly adherent and its union with the surrounding skin so perfect that the protective bandage could be dispensed with.

So far the operation was a perfect success; but the lid showed a strange appearance inasmuch as the transplanted eye-lashes in the centre of the lid were 4 millimetres lower than the ciliary line of the lateral portions. I hoped, however, the shrinkage of the flap which we always have to expect, would gradually bring those eyelashes back into the line; and anxious to watch the further changes, I kept the patient under observation a whole month. The anticipated shrinkage took place and reduced the size of the flap one-half; but in the meanwhile the eyelashes dropped out and soon there were only two eyelashes left of a dozen or more, and when the patient was discharged (March 24) those two solitary eyelashes were the only landmarks to remind us that once there was a luxuriant growth of eyelashes in that piece of the eyelid.

The loss of the eyelashes being limited in this case to a small area, it has not caused any appreciable blemish; but should the same result follow the reversion of the whole ciliary border of the upper we must concede that it would badly mar the appearance of the eyelid.

It would, of course, be an unpardonable presumption should I pass judgment on the merits of Stellwag's operation on the strength of one single observation. But, inasmuch as the author himself has admitted that his operation was often fatal to the growth of the eyelashes, I do not think his method can ever win the general recognition of ophthalmic surgeons; for I am of the opinion that any new operation for trichiasis destined to supplant our present methods, must not only permanently relieve the patient of his trouble, but also remove the deformity of the lid border; it must not only avoid the possibility or probability of mutilating the eyelid, but should restore as nearly as possible the natural appearance of the lid border.

SIMPLE METHODS OF FINDING THE AXIS OF A PRISM.

BY WARD A. HOLDEN, A. B., M. D., CINCINNATI, O.

It is often desirable when prisms have been prescribed, to find whether the optician has placed them in the frames with the axis at the proper angle, and there is often doubt as to the correctness of the axis mark on test case prisms. It is not surprising that the optician marks prisms incorrectly, when we see the rough methods of finding the axis that he uses. Some opticians place a prism in the angle of a hinged rule, so that one leg of the rule touches each surface, of the prism, and then turn the prism to the point where it spreads the legs of the rule furthest apart, and here mark the axis along the edge of the rule. And they regard as satisfactory such rough tests as this.

It is proposed here to glance over some simple practical methods of finding the axis of a prism.

I. A prism when looked through produces a false image displaced in the direction of the summit of the prism. If, both eyes being open, a prism is held before one eye, two images are seen, one true and one displaced, and a line between similar points in the two images corresponds to the axis of the prism. When a line is observed and the prism is rotated, at some point the true and false images of the line become fused at their near ends and continuous. The false image here is displaced, but it is displaced exactly in the direction of the line, so the line is not broken, and this line corresponds to the axis of the prism. A card may be placed half way across the prism so that its edge coincides with the line observed, and along this edge the axis of the prism may be marked.

This test is more satisfactory if the test line is vertical, and

the observer should have no insufficiency of the recti muscles. It works well with strong prisms, but for weaker prisms other tests are better.

II. If a line is observed with one eye closed while a prism is held a few inches in front of the other, a displaced image of part of the line will be seen through the prism, while a true image of part of the line will be seen outside of the prism. When the prism is rotated, the two images of the line become continuous. At this point the line corresponds to the axis of the prism. A card may be placed partly over the prism as before, so that its edge coincides with the unbroken line, and the axis may be marked from the edge.

This test is very accurate and can be used on the weakest prism.

III. If a person having one eye closed looks through a prism with the other, he sees a *strong* image displaced in a direction toward the summit of the prism. This image is formed by rays coming directly through the prism. If the object observed is luminous, a secondary *faint* image will be seen displaced more than the strong primary one, but displaced in the same direction. This image is formed by rays which are twice reflected within the prism before emerging from it. These rays pass through the prism, and striking the surface next the eye they are reflected back to the other surface. This in its turn reflects the rays, and they passing a third time through the prism, emerge from it. The direction of the rays is changed by this double internal reflection, so that when they emerge they are turned further toward the base of the prism than those which pass directly through, and the projected image appears nearer the summit. A line between similar points in the two images here also corresponds to the axis of the prism.

This faint secondary image is often, by the way, a source of confusion to both patient and oculist in tests with prisms. It can be cut off by covering the prism with a card having a small hole in it, through which the direct rays alone can pass.

IV. If a prism is held so that rays of light pass through it

and fall on a screen, the rays are deflected and instead of falling on the screen directly behind the prism, they fall to one side.

Behind the prism where no rays fall, the screen shows a dark patch in the position in which the shadow would be, if the prism were opaque. At one side where the deflected rays fall, there are double the number of rays and a patch appears here lighter than the rest of the screen. When the prism is held near the screen the light and dark patches are overlapped, and appear small and near each other.

But when the prism is removed some distance, if the rays are coming parallel the two patches will each be the size of the prism and a distance apart, and this distance increases as the prism is removed from the screen. The deflection is toward the base of the prism and in the line of its axis. A line then connecting similar points in the patches is the line of axis of the prism, *e. g.*, if the prism is rotated until the two patches become tangent to a horizontal line on the screen, then the axis of the prism is horizontal.

V. When a prism is held before the eye, a double reflection of objects behind the observer may be seen. Each surface of the prism reflects rays which form an image. From the surface near the eye the rays are reflected back directly. The rays reflected from the further surface pass through the prism twice and their direction is changed. Thus two images are formed which appear some distance apart. The distance between them increases as the object or prism is removed from the eye, and increases with the strength of the prism. Corresponding points in the two images are in the line of axis of the prism.

This is one of the simplest and most accurate methods of finding the axis of a prism. To perform it easily, a person may stand with his back to a window, after selecting a cross-bar of the window-frame that is of the height of the eye. Then the prism may be held before the eye on a level with it, and in a plane parallel to the plane of the window, and two images of the horizontal bar are seen. As the prism is ro-

tated the two images fuse at the ends and form a single line. If the prism is not held properly the line will be bent. But when the prism is held at the height of the eye and window-bar, and held with one surface in a plane parallel to the window, the two images fusing form a single straight line, and the line corresponds to the axis of the prism which may be marked from the edge of a card as in the other tests.

VI. When two prisms of equal strength are placed together with bases in opposite directions, the external surfaces of the combination are parallel, and the combination has simply the effect of a plain glass.

To find the axis of a prism whose degree is known, a prism of the same degree (or a combination equal to it) having a correctly marked axis, may be placed with base in the opposite direction against it, and this combination held before the eye. A line is then observed while the prisms are rotated. If the image of the line seen through the prisms does not move, and is always continuous with the image of the line seen outside the prisms, the axes of the two correspond. If there is some movement of the image when the prisms are rotated, or if the line does not appear always continuous, one prism may be turned on the other and the test repeated until the line appears always continuous, and is not altered by the rotation. Then the axes of the two correspond and from the correctly marked prism the other may be marked.

Some of these tests may often be found useful. And if oculists were to check the axis marks, they would be surprised to see how few prisms except those made by the most reliable houses, really have them correct.

SEVERE INJURIES TO THE EYE-BALL.

BY ADOLF ALT, M. D.

In these days of antiseptic surgery we are, perhaps, a little too apt to attribute every good (and perhaps unexpectedly good) result to the antiseptic measures which were employed. This enthusiasm, undoubtedly warranted in many instances, may perchance be apt to let us forget, that our good results cannot all be due to the novel methods and the theories they are based on.

It is, therefore, I think, sometimes well for comparison's sake to look back to our experiences before we adopted antiseptic measures, and to compare them with the more recent ones. I must say, that when doing so with regard to severe injuries of the eyeball, I was astonished, how good the results had been in fresh cases in my private practice before I applied antiseptic measures. Of course, I know full well, that the supposition that the injuring bodies were aseptic, may be adduced as an explanation. Yet, this does not absolutely satisfy my mind.

In the following pages I want to relate a number of cases of severe injuries to the eyeball, which I have seen in private practice during a period of five years, and which without antiseptics have healed well. I want further to state, that the number of fresh severe injuries which led to destruction of the injured eye, seen during the same period and in private practice is only two, and they were lost when I saw them first. The multitude of less severe injuries, burns, etc., is of no interest.

CASE I. J. H., æt. 17, a wagon-maker, had an iron rod run into his right eye, while stooping over the hole in the wagon through which the rod was being forced. Some water and blood ran out of the eye at once and sight was gone. I saw him three hours afterward and found the following: There was slight episcleral injection. Where the upper and middle

thirds of the cornea joined, a ragged wound with whitish edges ran somewhat curved across the cornea. Shreds of iris-tissue were hanging out of the two ends of the wound which both lay at the beginning of the ciliary region. One shred, like a thread, reached down upon the cheek. There was some blood in what remained of the anterior chamber. Sight was reduced to perception of light. I removed the prolapsed pieces of iris, and cleansed the wound as well as the unmanageable patient would allow. During this manipulation the as yet perfectly transparent, but evidently dislocated lens would present in the wound on the slightest pressure. There was evidently blood in the vitreous body, as no reflex could be obtained from the fundus of the eye.

The treatment consisted of rest on the back and the continued application of iced compresses. Under this treatment the wound closed and the blood became absorbed, so that on the eighth day after the injury he could count fingers at three feet. On the eighteenth day I discharged him with a deep anterior chamber in the lower portion, an anterior synechia, or rather multiple ones of shreds of the ciliary portion of the iris upwards, beginning cataract and $V = \frac{10}{cc}$. Patient never allowed me any further operative interference. I have seen him the last time fully five years after the injury had been received, and found the lens almost totally absorbed, thus showing that its capsule had been injured. Some stripes of grayish capsule ran across the irregular and large pupil. There were the remains of a large rupture of the choroid running concentrically with and almost all around the optic papilla. V was then $\frac{20}{cc}$, but could not be improved with glasses. He never felt any inconvenience from this eye.

CASE II. K. K., æt. 33, was struck into the left eye with a piece of wood by his infuriated wife whom he had ill-treated. Some blood had come out of the eye, and sight was greatly reduced. The next day, when I saw him, I found his sight $= \frac{6}{cc}$. There was a ragged wound in the lower inner quadrant of the cornea extending to the corneo-scleral margin in which the iris was caught. The iris-tissue was discolored. The pupil

was very wide, especially upward, and the whole of the pupillary margin of the iris was tilted backwards. The lens showed dim stripes, as we see them in beginning senile cataract, the vitreous was dim and contained some blood. The lens was slightly dislocated up- and backwards. The upper and lower lids showed superficial wounds. Recumbent position and ice were ordered, and under this treatment the wound healed, and the inflammatory symptoms disappeared, as well as the blood from the vitreous body. When I discharged him twelve days after the injury had been received, the pupil and the pupillary edge of the iris were in the same condition, the vitreous body was liquid and contained some floating opacities. Sight was $\frac{8}{\text{cc}}$.

CASE III. F. B., a bottle-piler in a champagne factory, æt. 57, was struck into the left eye by pieces of a bursting bottle. I saw him on the same day. The upper lid was cut into by an oblique wound, and there was a corresponding cut in the lower one, which, however, did not reach the lid-margin. The cornea had a cut running across it obliquely in the lower outer quadrant, with its ends at the beginning of the ciliary region. The prolapsed iris lay in this wound and with it a bead of vitreous body. The lens was gone, and blood and fibrine filled the distorted pupil. Perception of light. The treatment was recumbent position and compressive bandage after abscision of the prolapsed iris. Later on, when some slight inflammatory reaction took place, iced compresses. The eye healed gently, and vision, although dim on account of large floating opacities, rose to $\frac{18}{\text{cc}}$. The wounds in the upper and the lower lid I stitched at the first visit. The lower lid by the traction of the scar became everted, and the ectropium was later on operated upon. The eye which I had occasion to see from time to time for several years did not cause any inconvenience.

CASE IV. H. P., æt. 12 years, had loaded a bottle with powder and applied a fuse to it. When he thought this had gone out, he blew on it and the bottle promptly exploded and cut his left eye. I saw him three hours afterward. There was a T-shaped cut in the sclerotic on the nasal side of the eyeball,

the horizontal branch of the T lying vertically and passing through the ciliary body. The triangular gap was filled by clear vitreous body. No pain was complained of. $V=20/_{cc}$. The reflex from the fundus was good, but no details could be made out. Under a compressive bandage in the recumbent position this wound healed rapidly and firmly, so that three weeks after the injury a flat and contracted scar was all that remained. The scar in the choroid and retina was also well visible with the ophthalmoscope. $V=20/_{xxx}$; Sn. No. 2 easily. Although six years have passed since, this eye is to-day as good as it was when I discharged the patient.

CASE V. B. F., æt. 40, boss in a quarry, was severely injured all over his body and on his eyes by a premature explosion. I saw him two days after the injury was received. I found the lids of both eyes œdematous and much swollen. The left eye was chemotic, there was a torn, ragged gap in the lower third of the cornea through which iris, lens substance and some vitreous body protruded. There was purulent panophthalmitis, $V=0$. This eye became soon phthisical.

The right eye was also somewhat chemotic; sclerotic and cornea were studded with grains of powder. There were two openings in the cornea in its lower half, the wound lips being evidently burned. There was no anterior chamber. Whether the lens was injured could not be distinctly made out. Where the cornea was perforated large ulcers developed which only after long and careful nursing healed with anterior synechiæ. During this time the lens into which several grains of powder had evidently penetrated, began to become cataractous. It took a whole year for this eye (the lids were, besides, suffering from trachoma) to become quiet, new attacks of inflammation coming on again and again. To have the cataract extracted the patient absolutely refused. Yet, I succeeded in making an opening into the zonule of Zinn behind a clear portion of the cornea, through which by the aid of a convex lens he can count fingers at twelve feet, and with this amount of vision he has now for four years been able to superintend his work again, without further trouble.

CASE VI. E. J., æt. 26, had been trying to bend a piece of iron a few hours before I saw him. The iron broke off and struck the right eye, which he thought had become blind at once. There was a straight, sharp cut in the cornea forming a tangent to the margin of a middle wide pupil. The anterior chamber was very shallow, the pupil contracted and the portion of the lens corresponding to the wound in the cornea was gray and untransparent. When the pupil under the influence of atropine began to dilate, the pupillary margin of the iris was adherent to the dim portion of the lens and appeared pressed into it. This posterior synechia remained permanent. The dimness of the lens gradually disappeared until it just formed a thin grayish ring around the place, where the iris was attached to and apparently blocked the rupture in the anterior lens-capsule. This condition has now for two years remained unchanged.

CASE VII. C. C., æt. 6, had been injured in the right eye by a gun-cap several days before I saw him. I found the eye but moderately congested. There was a small healing wound in the lower part of the cornea near the corneo-scleral margin and parallel with it. The pupil was contracted. There lay a small shining body between the pupillary edge of the iris and the dim lens. When I succeeded in dilating the pupil somewhat, this shining body grew in size as the pupil dilated. I then reopened the old wound, but soon found that it was too small for the removal of the foreign substance and enlarged it. Then entering with a smooth forceps I tried to move the piece of gun-cap, but could at first apparently not move it. Gradually I got it loose, but in order to get it out of the eye, I had to move it first upward sliding upon the anterior surface of the upper portion of the iris. After having done so, I could withdraw it from the wound. It was a flat piece of percussion cap, nine by four millimetres in size. No reaction followed, excepting that due to the gradual swelling of the injured lens. After having, however, extracted most of that on the fourth day after the removal of the foreign body, all inflammatory symptoms subsided, and the patient went away with a healthy and useful eye.

CASE VIII. L. B. S., æt. 55, carpenter, was struck into the left eye a few hours before consulting me by a piece of a nail which broke off while he hammered it into a board. I found a piece of conjunctiva torn off and a ragged wound in the inner half of the cornea near the corneo-scleral junction. The iris protruded through this opening, there was some fresh blood in what there was of an anterior chamber, and evidently blood in the vitreous body, as no reflex could be obtained from the fundus. It could not be made out distinctly whether the lens was injured, but it was very probable from the condition of the injury. V. reduced to perception of light. The prolapse being snipped off, I ordered recumbent position and iced compresses. In the next few days a slight iritis was developed, but it yielded soon to the instillations of atropia. Gradually the blood became absorbed and V. rose to $\frac{8}{200}$ in the second week after the injury had been received. There were now a number of large floating opacities in the vitreous body. When I saw him a year later, the lens was very dim, but he did not think of eventually allowing its extraction.

CASE IX. Ch. D., æt. 38, wire-puller in a large wire factory, was struck into the right eye half an hour before consulting me by the broken end of the wire he was pulling when it snapped in two. Sight was at once abolished. I found a triangular wound in the outer lower quadrant of the cornea near the corneo-scleral margin, to which corresponded a similar triangular opening in the iris. The bottom of the shallow anterior chamber contained fresh blood. No reflex could be obtained from the fundus. Under iced compresses applied continually while the patient was in the recumbent position the corneal wound healed and the blood in the anterior chamber disappeared. A week after the injury had been received the pupil was dilated *ad maximum* and large floating opacities were seen in the vitreous body. V. was now $\frac{20}{cc}$. The transparent lens was tremulous and pressed the site of the traumatic opening in the periphery of the iris forward into the anterior chamber. No inflammatory symptoms ever made their appearance.

CASE X. F. W., æt. 14, employed in a soda-water factory, was engaged in corking bottles, when one burst and a piece struck his left eye. I saw him the day after: he was in great pain, and the lids of the left eye were considerably swollen. There was a cut in the cornea corresponding to the inner margin of a middle wide pupil. The anterior chamber was empty and corresponding to the corneal wound the discolored iris was literally pressed into the anterior lens capsule. The lens, when the unadherent portions of the iris had yielded to the influence of atropine, showed the symptoms of an anterior cortical cataract, so dim already that no details of the fundus could be made out. Under iced compresses in the recumbent position the wound healed nicely, so that two weeks after the injury had been received the eye was almost free from any signs of irritation. During these two weeks the dimness of the lens gradually disappeared and the fundus of the eye became more and more clearly visible. When I discharged the patient the dimness of the lens was confined to the site of the posterior synechia and V. was $\frac{20}{200}$. I have seen the patient about a year afterwards and found the condition exactly the same. V. had increased to $\frac{30}{1}$.

This case is almost identical with case VI. at least as far as the posterior synechia and the lens are concerned. In both cases the anterior lens-capsule has evidently been injured and the iris been forced into this wound. Whether the resulting partial cataract was due to the mechanical disturbance of the lens-fibres and to the fact that they had been shifted out of position in an irregular manner, or to the imbibition with aqueous humor, is not clear. Certainly these conditions became changed and the norm was almost re-established as soon as a firmer adhesion, due to proliferation, had taken place between the iris and the wound in the lens-capsule. If the imbibition with aqueous humor was the cause of the cataract, this solid synechia may have acted like a stopper, so to speak, and may have prevented any further amount of aqueous humor from entering the lens-substance.

I have since refrained from absolutely predicting the formation of a cataract after similar injuries.

CASE XI.—J. M., æt. 32, when opening a soda-water bottle was struck on the left eye by the cork. Sight was at once considerably impaired and had remained so when I saw him several days afterwards. The pupil was dilated by atropia. The central portion of the anterior corticalis of the lens to the extent of a medium wide pupil was gray. Through the periphery of the lens the fundus could be seen. There was venous hyperæmia of the retina, the optic papilla was brick-red. Three weeks afterwards the lens and fundus were again normal and sight $\frac{20}{xxx}$.

This case is related here in connection with the others on account of the disappearance of a considerable amount of dimness of the lens caused by an injury.

CASE XII.—H. B., engineer, æt. 29, when working on putting up an engine, was struck in the left eye by a foreign body. When I saw him a few hours afterwards, I found a wound at the inner corneo-scleral margin from which a piece of metal protruded. I extracted it at once, and found to my astonishment that it was $7\frac{1}{2}$ millimetres long. There was also a prolapse of the iris, which I snipped off, so that it amounted to a regular iridectomy. It was now seen that the metal had pierced the equator of the lens. The wounds under ice healed kindly and quickly. The cataract progressed rapidly: the patient who did not want to lose any further time refused extraction. I thereupon needled it and the result was very satisfactory. Patient has not experienced any further inconvenience from this eye.

CASE XIII.—D. J., æt. 33, carpenter, was struck by a beam into the left eye. He came three days later to consult me. There was a perpendicular healing wound in the upper lid extending upwards into the brow. The lid was considerably swollen. The eye was greatly injected, there were deposits of lead on the cornea and conjunctiva (some lead-wash having been prescribed by some physician); almost the whole of the upper half of the discolored iris was torn from its ciliary insertion, tilted forward, and its periphery was held in a small opening of the cornea a little below its centre. The lens was dim

and the vitreous body filled with blood. I removed the deposits of lead, made an iridectomy upwards, and in doing so cleansed the corneal wound of the iris tissue. I then applied a compressive bandage. Within the next few days there was great pain and irritation, yet the wounds healed gently. The cataract which was formed I operated later on by discission. V. $\frac{20}{200}$.

CASE XIV.—K. M., æt. 14, was shot into the right eye by some pin-like missile sent from a bean-shooter. I saw him the next day and found V.=1. There was some circumcorneal injection. In the centre of the cornea was a small opening through which a thread of fibrine protruded, which on its other end was connected with some fibrinous exudation in the very narrow pupil. When I had succeeded in dilating the pupil there remained two or three fine posterior synechiæ. The lens which had evidently been pierced in an oblique direction was generally dim and swollen. Two days later when the rapid swelling of the lens matter caused severe pain and glaucomatous symptoms, I extracted about half of it. Under ice and while the patient lay quietly on his back the wounds healed well. A few weeks later I made discission of the remaining portion of the lens, which caused no disturbance and brought vision up to $\frac{20}{xx}$.

CASE XV.—Miss E. B., æt. 27, while breaking a bottle was struck by a piece into the right eye. Patient had very protruding eyes, having a myopia of $\frac{1}{2}$. I saw her four hours after the accident. The lids were then considerably swollen. There was a clean cut running obliquely from down-inward to up- and outwards through cornea, iris and lens, sclerotic and ciliary body. Shreds of iris lay in the wound. There was no anterior chamber. V=0. Enucleation being refused, I trimmed the wound, and had ice applied in the recumbent position. The wound healed nicely. For a time the cataractous lens was much swollen, and the scar seemed to become ectatic. But this subsided again and gradually a small pupillary opening appeared up- and outwards behind which the lens-substance was sufficiently absorbed to allow of counting fingers at eight feet. No further disturbance has occurred in the year which has since elapsed.

TRANSLATION.

The following biography of Prof. Ferdinand von Arlt, of Vienna, whose death we announced in our last issue is from the hand of his able pupil, Professor Sattler, now of Prague, who in the name of the Heidelberg Ophthalmological Society, laid a wreath on the last resting place of the deceased and pronounced the following eulogy:

FERDINAND VON ARLT

1812 TO 1887.

The Ophthalmological Society sends through me to their oldest and truest member, to their honored nestor, the last and parting greeting.

Since it was founded, twenty-five years ago, thou hast every year, with scarce an exception, wended thy way towards the beautiful city on the Neckar, where thy greatest and most ingenious pupil, the incomparable A. von Graefe, gathered his colleagues and friends around him for the mutual exchange of experiences and for free and friendly intercourse. Here we could witness the true, unfeigned, lasting friendship by which these two eminent men of so different a character were united. And, when the most brilliant star of the three on the ophthalmological sky became extinguished, it was on thee and Donders that year by year all signs of veneration and love were heaped, which esteem and friendship can offer to mortals. Never couldst thou answer the toast without tears of emotion, which one of us in token of the universal esteem brought to thee in the name of the society. The amiable, modest manner in which thou didst meet with us there, teaching, and, as thou saidst thyself, learning, the way in which thou didst encourage and help the young scholars with benevolence and forbearance, and in which thou didst strive to correct what appeared to thee erroneous, could not but win thee the hearts of all of us. No

wonder that the number of thy friends and admirers grew steadily, since thou didst gain new ones continually and never lost one, holding them all fast with the charm of thy amiability. There in Heidelberg, amidst thy young and old friends, thou wast ever at home, there thou wast rejuvenated, thou couldst forget all sorrows, which were not spared thee during thy earthly career. Here, at thy resting place, we mourn not the loss of a warm-hearted promotor of our society, of the model of a conscientious, reliable worker only, but we deplore also the loss of the best and truest of friends. Thy memory will live gloriously in our society as long as it exists. Peace to thine ashes!

March 7, at 2 o'clock, P. M., the earthly career of a man of the highest eminence in our special science has been closed. Ferdinand von Arlt, whose name is connected with fully eight lustra of the history of ophthalmology, is no longer among us.

Clear and well rounded, as the life of few only, his life lies before us; because his manner was open and unaffected, and he has preserved a natural, often pathetic naiveté, to his end. There was nothing enigmatical, nothing repulsive in his manner; truth and reliability formed the main traits of his character. With his friends he knew no secrets.

The brilliant stride forward made by ophthalmology in the second half of our century took place during the time of Arlt's teaching and active life, and this fact gives to the life of this man an especial interest for us ophthalmologists.

Born April 18, 1812, at Obergraupen, near Teplitz, in Bohemia, he was the fourth of the six children of a poor smith in the mountains, and grew up in poverty. He learned early how to bear wants, how to deprive himself of luxuries, and how to be satisfied with only the most necessary. When eight years old, he was given into board with a relative, the school-master at Weiss-Kirchlitz, and himself was to be educated as a school-teacher. Here too, he did not see his best days, and, since he did not have the talent for music, then thought necessary for a school-teacher, he was sent together with his brother

Dominik to the gymnasium at Leitmeritz when he was thirteen years old, there to prepare himself for the ministry. Here, too, on account of the insufficiency of the subsidies sent by the parents, the two brothers had to go through bad times. Dependent to a large portion on the help of benevolent people, to whom he showed himself grateful all his life, the youth was early trained and armed for the earnest fight of life, and forced into the hard path of diligent, untiring labor, which later on bore such a richness of fruit.

Beginning with the third year at the gymnasium he earned his subsistence by teaching younger pupils. When entering the University of Prague in the fall of 1831 with his brother the sorrows regarding their life were renewed. Having succeeded in getting a position as teacher in a family, he changed from the studies of theology to those of medicine (to the great sorrow of his mother), and embraced the latter with diligence and enthusiasm. * * * Among his teachers, who with a few exceptions cannot be called eminent, he was chiefly attracted by the professor of ophthalmology, J. N. Fischer. This circumstance decided his choice of ophthalmology for his practice.

Fischer came directly from the celebrated school of Beer, but, though remaining upon the standpoint of that school, he was greatly taken with the new and strongly scientific current of thought in studying and teaching medicine just then inaugurated by Skoda and Rokitansky. He promised Arlt, who was his pet pupil, a position as assistant in his clinic, when he had graduated in the fall of 1839, but imposed it upon him to first go to Vienna for three months. He there listened to Skoda and Rokitansky's lectures and demonstrations, and took a course on surgery with the then renowned Friedrich Jaeger.

In April, 1840, Arlt took the place as assistant to Professor Fischer, and remained in it for two years. They seem to have been on extremely intimate and friendly terms together, and so remained further on.

During the time between 1842 and 1846 he practiced also internal medicine and surgery besides ophthalmology; his sci-

entific and literary work, however, was especially and continually given to his special profession, and what is especially interesting, he delivered as an extraordinary docent, the first lectures on otology. Troeltsch received his first lessons in this branch by Arlt.

In 1847, when Fischer (then seventy years old) began to be sick, Arlt, at his request, was nominated to fill the chair of ophthalmology temporarily, and after Fischer's death in 1848, Arlt was one of the candidates who took part in the concours for that chair, as was then the custom. The decision was not rendered until late in the summer of 1849 on account of the political excitement, and an equally strong rival, Jos. von Hasner, who had also taken part in the concours, had very good chances. But, finally, after Arlt had been called to the University of Leipzig as professor ordinarius, he was given the professorship in Prague.

Having thus reached his aim he displayed an extreme love for study and a fruitful literary activity, aside from his untiring devotion to his position as teacher and large and blissful practice as oculist and operator. With regard to his literary activity the period at Prague, 1842 to 1856, is undoubtedly the most important one, when judging the position of this man in the history of ophthalmology. Here his ideas became clearer and clearer, and free from the old and traditional: here he deposited them when perfectly matured in a number of valuable papers, which, in the *Prague Monthly for Practical Medicine*, at that time an esteemed and widely circulated journal, were given to the scientific world. Here also he wrote his really classical text-book on the diseases of the eye, which appeared in three volumes in 1851, 1853 and 1856. In order to put the right value upon the enormous progress which is made in Arlt's text-book, it is only necessary to remind the reader of the text-books which were especially in use in the beginning of the fifth decade, although even they contained a great deal that was good. Strictly logical in the arrangement of the matter, he knew how to unite in one clinical picture what belonged together, and he distinctly separated those heterogenous con-

ditions which until then had been frequently confounded in the most unnatural manner. All through we find an admirably strict observation of nature and understanding of the phenomena; we think the description of the different diseases unexcelled; the many real models of histories of cases which are given at the proper places are especially instructive. He knew, as hardly any one else, how to keep the right measure in making use of the anatomy for the explanation of symptoms, and to give the general condition of the organism its due. Although the anatomical order was the guiding principle in the arrangement of the book, and although he laid great stress upon the study of the normal and pathological anatomy of the eye, in order to understand the physiological and pathological phenomena, and although he did a great deal of highly useful literary work in this department, he never lost sight of the importance of the search after the etiological moments.

In some of the ophthalmological text-books which appeared at the same time or even somewhat before, and in the numerous ones which have been published later on, the anatomical tendency, to which we undoubtedly owe infinitely much in medicine, has, under the influence of Rokitsansky and Virchow, come more and more exclusively into the foreground, according to the prevalent opinions of the period. For the sake of the anatomical arrangement and the anatomical nomenclature, and hand in hand with the increasing knowledge of the anatomical changes, and the sharper definition of the local processes, the study, after a possible connection with some affection of the general system, was more and more lost sight of. * * *

* * * Arlt never forgot that, with all due recognition of the importance of an exact analysis of the local changes and the necessity of local therapeutic measures, the condition of the remaining organs and maybe general affections, would require just as much and perhaps the main attention. And this tradition has lived ever since in Arlt's school, and has been destined to come more and more to the front.

This superiority secured for Arlt's text-book, among the students and as a help to the general practitioner, a degree of

popularity as none of the contemporaneous books and but few of the later ones have enjoyed. Since the largest portion of his book was written at the time before the ophthalmoscope had been invented, it is natural that the part which treats upon the diseases of the conjunctiva and the anterior portions of the eyeball, is the most valuable one. This anterior portion of the eyeball has always more especially been the domain of Arlt's teaching and working. What he has taught and written with regard to it is—notwithstanding that we may not agree with it in all particulars—as a whole decidedly the best that our literature possesses on this subject.

Arlt, however has also earned a lasting fame by bringing some light into the then dark region of the deeper diseases of the eye by ingenious observation and careful anatomical researches, by the exact dissection of myopic eyes and the recognition of the connection between the elongation of the eyeball and myopia.

In making anatomical specimens he excelled by his technique, cleanliness and exactitude. This is proven by his numerous sections through the whole eyeball, his most instructive preparations concerning the anatomy of the orbicular muscle, and the lachrymal sac, and, not least, by the communications regarding the anatomy of the eye in the third volume of the *Archiv fuer Ophthalmologie*, 1857. I may state here that Arlt discovered the existence of circular fibres in the ciliary muscle, and recognized correctly their action during the accommodation of the eye sooner than did Heinrich Mueller.

We must not here forget the popular book, "On the Care of the Healthy and the Sick Eyes, with an Appendix on Spectacles," which appeared during the period at Prague, and had several editions. This book had an enormous circulation and popularity, and stood far above the different similar books with which then and later the public was flooded, on account of its clear and pregnant description, the rich treasures of experience, and the scientific character visible throughout. More than in any other of his works we here recognize the inmost character of our honored master as a humanitarian, as physician and as teacher.

It was also at Prague in the fall of 1848, that the young Graefe visited Arlt, and was so powerfully attracted by the manner in which he practiced and taught ophthalmology that this mainly confirmed his intention to give his life to the practice of this branch of medicine.

From that time an intimate and mutual friendship united these two heroes of our science until death.

After having enlarged his knowledge and experience considerably in Paris and Vienna, Graefe returned in July, 1850, for a fortnight to Arlt, in order to discuss with his friend so many yet open questions in ophthalmology, and other things weighing on his mind.

In 1855 Arlt was made one of the editors of the *Archiv f. Ophthalmologie*, and although he did not contribute many papers to it, the few published there are of high value, especially those of an anatomical and clinical character, which show his eminent qualities in the best light.

When, by the death of Rosas in 1856, the chair of ophthalmology in Vienna became vacant, Arlt was called to it and taught there until the latter part of July, 1883. In this year—he had reached his seventieth year already in 1882—he left the chair, according to the law existing in Austria.

Above we have called the period of time Arlt spent at Prague the most important in judging his position in ophthalmology, and he himself thought always of that period with especial feeling, yet his period at Vienna, after he had conquered the difficulties which presented themselves there to the newcomer, very soon became the most brilliant period of his life.

His successes as physician and as operator, combined with his amiable, truly humanitarian manner in which he treated whoever came to ask his help, soon brought an enormous number of patients into his clinic, and procured him an almost overwhelming private practice. He met rich and poor with the same careful attention. He saw in every patient first the sufferer who needed sympathy, in the second line only the object for study and teaching. And even where his art was helpless, he knew, in his own peculiar way, to give solace to the unfor-

fortunate, and thus to benefit him. How often, when the means were wanting to carry out the necessary dietetic and hygienic measures, did he unnoticed slip the necessary sum into the hand of a poor child's mother. How many are the indigent ones, who, since they were ashamed of going to the public clinic, were treated by him gratuitously or almost so at his private office!

His mastership in operating was admirable, and he did not lose it even when his old age rendered his hand sometimes a little shaky. It may be that his coevals, von Jaeger and von Hasner operated with superior elegance, yet the quiet security of every step, the care with which he attended to everything, even to the bandaging of the patient, cannot be too much extolled. He, like them, was ambidexter, and he never tired of insisting on the supremacy of this faculty, which is an heirloom of his school.

When we ask why Arlt, who was a master like but few in the flap-extraction, gave up this method in 1866, after von Graefe in 1865 had recommended the linear extraction, and which he like others had first to exercise, we can only say that this was to be expected from his modest ways and from the principle to let every personal comfort give way to the weal of the patient. This was the more natural since, from the convincing manner in which von Graefe knew how to inaugurate his new method, there seemed to be a justified hope to diminish the percentage of losses still more which, in Arlt's hands with the flap extraction at Prague as well as at Vienna, had been seven, and some tenths per cent. That this was the correct proposition is shown to evidence in the statistics of his operations as published in the hand-book of Graefe and Saemisch, Vol. III, 1.

Arlt evinced a rare love and devotion in his profession as teacher throughout his life. He was, so to say, in his element when in the clinic and surrounded by a dense crowd of pupils; here he became rejuvenated in every semester. It was not the power of a brilliant rhetoric, not the endowment with ingenious *aperçus*, not his sonorous voice, that captivated the audience, but just the simple perspicuity of his words, the precision

of expression, the logical building up in the description of the pathological processes. He spoke just as he wrote. He was, however, not satisfied with the lecture, but gave the preponderance to the demonstration. He took great care that every one should see and really understand the case on hand. He evinced a great pleasure when, at the close of the lecture hour or during the holidays, during which he used to come to the clinic with but rare exceptions, he could discuss finer details of ophthalmological questions which could not be brought into the lecture, with a circle of especially diligent students or foreign physicians. It was especially his private courses in operating, which he held every year until 1871, and to which he invited some of his pet students, which proved so attractive to foreigners who, in large numbers, crowded his clinics from all parts of the civilized world. These courses were indeed unequalled on account of the clear and precise descriptions of the indications, the detailing of all the possible mishaps during an operation and the rules how to prevent them, and also on account of the pains he took to teach each and every one the technics. What he taught up to 1871 is deposited in his classical work on operations on the eye in the hand-book of Graefe and Saemisch.

Every semester he used to give a number of systematic lectures on the errors of refraction and accommodation.

He did not demand a knowledge of the use of the ophthalmoscope from his students, partly because on account of the enormous number of students it was impossible to give them a thorough instruction, which alone might be of lasting value to them, and partly since his chief aim was to push the students so far that they learned how to observe correctly, that they felt secure in the diagnosis of the typical forms of diseases, that they could give the right prognosis and knew how to order rational therapeutic measures. He let his assistants give regular courses in ophthalmoscopy, and occasionally they held courses in ophthalmic surgery, in errors of refraction and accommodation, sometimes also on ophthalmometry, and normal and pathological histology of the eye.

Arlt always was on extremely friendly, even intimate terms with his pupils and assistants. They felt attached to him by grateful love and many of them remained in close friendship with him as long as he lived. He assisted them in their scientific work, and did all he could to make their future a bright one.

It was also given to him, as to few masters, to see a comparatively large number of his pupils engaged as professors and working to enlarge and spread his teachings. They are: Businelli at Rome, Rydel at Krakau, Becker at Heidelberg, Schuleck at Buda-Pest, Fuchs, first in Luettich, now in Vienna, and the writer of these lines, first at Giessen, then at Erlangen and now at Prague. Others are renowned practicing ophthalmologists, as Koller, von Reuss, Arlt, Jr. and Bergmeister at Vienna, Kerschbaumer at Salzburg, Denk at Linz. His last two pupils were Dimmer and Herz. Of two of his pet pupils, Tetzner and Bierman, death had robbed him.

Besides the papers in the *Archiv f. Ophthalmologie* the revised edition of his text-book on diseases of the eye and his treatise on ophthalmic surgery, there are a number of other publications which fall in his Vienna period. The injuries of the eye (*Wiener Med. Wochenschrift* and separately 1875); on the etiology and therapy of the blenorrhœa of the conjunctiva (*Mittheilungen des Vereins der Aerzte in Niederösterreich*, 1875); on the causes and the development of myopia, Vienna, 1876; on glaucoma, Vienna, 1884. The last two, the second of which is from the time after his retiring from the chair of ophthalmology, are of considerable importance; they open up a multitude of new points of view, and evince, apart from an untiring diligence, the unweakened ingenuity of the master. The quantity of valuable experiences which are especially collected in the last work make it an extremely valuable heirloom.

It is well known to all those who had the yearly occasion to greet the juvenile old man at the meeting of the Ophthalmological Society how lively was his interest in the progress of our science and her representatives until his last disease broke out. In the same way he enjoyed without limit the esteem

and veneration of all of his friends of many years, as well as of the younger members who there only made the acquaintance of the celebrated master, with his modest, retiring exterior.

Nor did he lack honors and signs of recognition from the government. He received the order of the Iron Crown, which raised him to the nobility, and numerous other orders, and in 1877 the title of *Hofrath*. For his 70th birth-day his friends and admirers came from far and near to bring to the beloved master a warm and heartfelt birthday greeting. It was a truly exalting feast, as it is in store for but few mortals, and it showed clearly the intimate relations between him and his pupils and friends.

Arlt, with all his eminence, possessed an uncommon degree of modesty, simplicity and lack of wants, as it becomes now rarer every day, and in a similar measure his infinite goodness of heart was a main feature of his character. For the indigent he had always an open hand, and to the poor student he was the more a fatherly friend, since he never forgot the hardships of his own youth, when the benevolence of noble patrons helped him on.

He never in his life forgot the attachment to his birth-place. He visited there every year during the holidays, built a school-house there, for which he had drawn the details himself, and many patients whom he operated upon there and in the vicinity, owe to him the sight they have regained.

It is deeply to be deplored that the rich life of so noble and eminent a man was to end in such a sad manner.

The trouble began from an unfortunate jump from a carriage, where he fell and broke the right arm. Although this fracture healed unexpectedly well a deep depression of his whole system and at times absolute insomnia supervened. In order to gain restoration and new strength he went in the beginning of last August to Johannisbad, in Bohemia. There he was suddenly attacked by gangrene of the left leg. After having nearly died at several occasions and having suffered continually from dreadful pain and insomnia, and in spite of

repeated operations he succumbed to his disease but a few weeks before his 75th birthday, in the arms of his loving daughter.

Not only his remaining family, not only his friends and colleagues, but thousands of grateful patients and pupils mourn the noble departed.

EDITORIAL NOTICE.

We have just received a copy of Dr. Swann M. Burnett's book on Astigmatism, published by J. H. Chambers & Co., and we bespeak for it a hearty welcome from our colleagues.

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